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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	19

Application Number	09/992,060
Filing Date	11/21/2001
First Named Inventor	ROBERT W. PARISH
Art Unit	2678
Examiner Name	Antonio A. Caschera
Attorney Docket Number	7240-US

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☑ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):
  1. Return Receipt Postcard

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Tektronix, Inc.		
Signature			
Printed name	Matthew D. Rabdau, Reg. No. 43,026		
Date	January 8, 2007	Reg. No.	43,026

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name	Marilyn Pashby	Date	January 8, 2007

PTO/SB/17 (12-04v2)
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Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($)	620.00

Complete if Known	
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METHOD OF PAYMENT (check all that apply)

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☑ Deposit Account Deposit Account Number: 20-0352 Deposit Account Name: TEKTRONIX, INC.

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	FILING FEES Small Entity Fee ($)	SEARCH FEES Fee ($)	SEARCH FEES Small Entity Fee ($)	EXAMINATION FEES Fee ($)	EXAMINATION FEES Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 20 or HP =	_____	x _____ =	.00

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 3 or HP =	_____	x _____ =	.00

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims Fee ($)	Multiple Dependent Claims Fee Paid ($)
_____	.00

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
_____ - 100 =	_____ / 50 =	_____ (round up to a whole number) x	_____ =	_____

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge): APPEAL BRIEF $500 + ONE MONTH EXTENSION FEE $120	620.00

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 43,026	Telephone 503-627-5068
Name (Print/Type)	Matthew D. Rabdau		Date January 8, 2007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **ROBERT W. PARISH, ET AL.**

Filed: **November 21, 2001** Examiner: **Antonio A. Caschera**

Serial No.: **09/992,060** Art Unit: **2678**

For: **IMAGE ALIAS REJECTION USING SHAPED STATISTICAL FILTERING**

January 8, 2007

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APPEAL BRIEF

Dear Sir:

This is an appeal from the Office Action of the Examiner dated September 8. 2006 finally rejecting claims 1-4 over prior art.

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Real Party in Interest

The real party in interest in this appeal is Appellants' assignee, Tektronix, Inc., an Oregon corporation.

Related Appeals and Interferences

There are no related appeals and interferences known to Appellants, Appellants' representatives or Appellants' assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

Status of Claims

Claims 1-4, the only claims in this case, all stand rejected over prior art and are the claims appealed.

Status of Amendments

No amendments were submitted subsequent to the Examiner's final rejection of claims 1-4.

Summary of the Invention

The present invention is a method of image alias rejection using shaped statistical filtering in a waveform rasterizer. When rasterizing a high resolution waveform (2048x2048) onto a limited, or lower, resolution display (640x480), an artifact appears in the rasterized waveform (bit-map display) that is sometimes called "jaggies", i.e., the spatial aliases of an undersampled image. A waveform rasterized in a much higher resolution may be subjected to an appropriate lowpass spatial filter which "smears" the points over several neighboring pixels, and then subsampled to the desired lower or limited display resolution. However this approach requires a very large raster memory that is very fast. (Page 1, lines 6-22) Where a 2x2 spatial kernel is used for lowpass filtering during rasterization, four memory cycles are needed to plot the output of the spatial filter, which due to limited memory bandwidth is not desired. (Page 2, lines 3-9)

In summary the method of the present invention dithers high resolution "X" and "Y" data with a value from a shaped random number generator, i.e., a shaped dither signal. The combined "X" and "Y" values are then truncated as appropriate for a lower resolution display and stored in a display raster memory. This eliminates the need for a high resolution memory and does not use multiplication. (Page 2, lines 15-20; Fig. 2) The results are shown in Fig. 4, which shows the waveform with "jaggies" and after processing according to the present method.

Specifically, as recited in **claims 1 and 4,** the present invention generates a shaped dither signal, which is in the form of a shaped statistical filter, as illustrated in Fig. 1(b), having a random shaped function representing a probability density

function for the impulse response of the filter being used. (Page 3, lines 3-10; page 4, lines 3-21) The shaped dither signal is combined with a dimensional component, "X" and/or "Y" data for a waveform sample or data point, to produce filtered data point values. (Fig. 2; page 4, lines 16-21) The filtered data point values are then subsampled to produce the desired lower resolution rasterized waveform for display. (Fig. 2; page 4, lines 21-24)

Claim 2 recites that a plurality of linear feedback shift registers may be used to produce random number outputs which are then summed to produce the shaped dither signal. (Fig. 3; page 6, lines 1-6) **Claim 3** additionally recites that the shaped dither signal may be contained in a look-up table. (Page 6, lines 6-9)

Issues

Whether claim 4 is rendered obvious under 35 U.S.C. 103(a) by Lusignan in view of Holcomb.

Grouping of Claims

Claims 1-4 are deemed to stand or fall together with claim 4 being a representative claim.

Argument

35 U.S.C. 103(a) provides in pertinent part that "[A] patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." The U.S. Supreme Court has set forth the following factual queries to determine obviousness: (1) the scope and content of the prior art; (2) the differences between the prior art and rejected claims; and (3) the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.* 148 USPQ 459, 467.

The Examiner states that Lusignan discloses "a shaped dither signal" as recited by Appellants and interpreted by the Examiner. The Examiner further states that Lusignan discloses adding the shaped dither signal with a dimensional value of each data point for a detected waveform to produce filtered data point values, interpreting "dimensional component" broadly as inherently present in the analog signal of Lusignan since the analog signal must be represented by some sort of "dimensions". The Examiner also states that the subsampling of data is found in Holcomb which deals with processing waveform signals, and therefore the combination of Holcomb with Lusignan teaches all of the elements of claim 4. The Examiner specifically asserts that the broad terms used by Appellants allow the Examiner to interpret the prior art broadly when applying the art to the claims, since limitations from the specification are not to be read into the claims.

Appellants submit that Lusignan teaches how to provide more accurate measurements at low amplitude signal levels, i.e., converting a low resolution output

from an A/D converter to a higher resolution output. (Column 6, lines 8-66) The present invention produces a better waveform image when the high resolution rasterized waveform image is converted to a lower resolution image, and is not related to measurement accuracy. Appellants recite a method for image alias rejection of a high resolution rasterized waveform, i.e., a waveform that has been digitized and placed in a raster memory as data points where one dimension represents time ("X") and the other represents amplitude ("Y") as is well known to one of ordinary skill in the oscilloscope/data acquisition arts, when a lower resolution rasterized waveform image is desired for display. This image aliasing due to rasterized image down conversion is not a problem addressed or considered by Lusignan. Therefore Appellants deem that Lusignan is not appropriate prior art since Lusignan does not address the problem addressed by the currently claimed invention.

Appellants generate a "shaped dither signal." The specification defines what a "shaped dither signal" is, i.e., a shaped statistical filter having a probability density function. Lusignan generates a common dither signal so that a low level signal may be digitized by an A/D converter to produce more data values for the low level signal. The Examiner appears to completely ignore the word "shaped" in the claim as relating to the dither signal. In order to understand what "shaped" means, the specification is looked to for a definition, which is not the same as reading limitations from the specification into the claims. There is no indication that Lusignan "shapes" the dither signal, the only requirement being that it be at a frequency different from the line frequency of the signal being measured. In order to understand what is meant by "shaped dither signal", one of ordinary skill in the art who has read the

specification has to conclude that it is defined as a shaped statistical filter having a probability density function. Appellants may be their own lexicographer for terms that are not ordinarily used, and that is how "shaped" is defined.

Further Appellants recite summing the shaped dither signal with a dimensional component of the high resolution rasterized waveform. It is true that Lusignan combines the dither signal with the analog signal so that the amplitudes combine, but this is not combining with a "dimensional component" of a rasterized waveform, i.e., data points in a raster memory representing an acquired waveform as is well known to those of ordinary skill in the oscilloscope art defined by X,Y locations in the raster memory where X = time and Y = amplitude. Lusignan combines the dither signal with the analog signal to improve measurement of low level signals prior to digitization, while Appellants combine the shaped dither signal with a dimensional component of the rasterized waveform so that subsequent subsampling produces a lower resolution waveform image for display without image aliasing. The Examiner cannot ignore words in the claim, and the Examiner has ignored the fact that the summation is related to a dimensional component of a "high resolution rasterized waveform". "Dimensional component" has to be read in context, and not in isolation.

Therefore Appellants submit that Lusignan does not produce "a shaped dither signal" as recited by Appellants; that Lusignan does not combine a dither signal with "a dimensional component . . . for the high resolution rasterized waveform"; and that Lusignan would have the same image aliasing problem as in the prior art when displaying the measurement results in a waveform display when subsampled to produce a lower resolution image. In order to provide image alias rejection

Lusignan, when displaying the disclosed measurements in a waveform display with a lower resolution than contained in the measurement data, would have to apply the "shaped dither signal" to the measurement data after digitization as recited by Appellants in claim 4.

Conclusion

In view of the foregoing remarks Appellants request that the Examiner's rejection of claims 1-4 be reversed, and that this case be passed to issue.

Respectfully submitted,

ROBERT W. PARISH, ET AL.

By _____

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Attorney's Docket No. 7240-US

Appealed Claims

1. An apparatus for image alias rejection of a high resolution rasterized waveform comprising:

means for generating a shaped dither signal;

means for summing the shaped dither signal with a dimensional component value of each data point for the high resolution rasterized waveform to produce filtered data point values; and

means for subsampling the filtered data point values to produce a desired lower resolution rasterized waveform for display.

2. The apparatus as recited in claim 1 wherein the generating means comprises:

a plurality of linear feedback shift registers, each producing a random number output; and

means for summing the random number outputs to produce the shaped dither signal.

3. The apparatus as recited in claim 1 wherein the generating means comprises a look-up table containing data corresponding to the shaped dither signal.

4. A method of image alias rejection for a high resolution rasterized waveform comprising the steps of:

generating a shaped dither signal;

summing the shaped dither signal with a dimensional component value of

each data point for the high resolution rasterized waveform to produce filtered data point values; and

subsampling the filtered data point values to produce a desired lower resolution rasterized waveform for display.

Evidence Appendix

No evidence was submitted pursuant to 37 C.F.R. §§ 1.130, 1.131 or 1.132, and no other evidence was entered by the Examiner.

Related Proceedings Appendix

There are no related proceedings identified in this Brief.